No. 9300257

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Farmers Marketing Corporation

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS REQUIRED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

DURUM WHEAT

'Bravadur'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 31st *day of* January *in the year of our Lord one thousand nine hundred and* ninety-four.

Attest:

Kenneth A. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Mike Espy
Secretary of Agriculture

FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1 NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Farmers Marketing Corporation

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
D5171-1

3. VARIETY NAME
Bravadur

4 ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
3501 E. Broadway Road
Phoenix, AZ 85040

5. PHONE *(Include area code)*
602/437-4058

FOR OFFICIAL USE ONLY

PVPO NUMBER
9300257

FILING
Date: July 8, 1993
Time: ☐ A.M. ☐ P.M.

FEES RECEIVED
Filing and Examination Fee: $ 2325.00
Date: July 7, 1993
Certificate Fee: $ 275.00
Date: Dec. 28, 1993

6. GENUS AND SPECIES NAME
Triticum turgidum L. variety durum

7. FAMILY NAME *(Botanical)*
Gramineae

8 CROP KIND NAME *(Common Name)*
Spring Durum Wheat

9 DATE OF DETERMINATION
August 1989

10 IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Corporation

11 IF INCORPORATED, GIVE STATE OF INCORPORATION
Arizona

12. DATE OF INCORPORATION
1952

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Rex K. Thompson, Plant Breeder
Farmers Marketing Corporation
3501 E. Broadway Road
Phoenix, AZ 85040
PHONE *(Include area code)*: 602/437-4058

14 CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*

a. ☒ Exhibit A, Origin and Breeding History of the Variety
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety.
d ☒ Exhibit D, Additional Description of Variety.
e ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
f ☒ Seed Sample (2,500 viable untreated seeds) Date Seed Sample mailed to Plant Variety Protection Office 7-1-93.
g. ☒ Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
☒ YES *(If "YES," answer items 16 and 17 below)* ☐ NO *(If "NO," skip to item 18 below)*

16 DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act. Give date _____.)
☒ NO

19 HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☒ YES (If "YES," give names of countries and dates) Greece - Greek Registry March 1993
☐ NO

20 The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Sheldon E. Richardson	President, C.E.O.	June 30, 1993
Sheldon E. Richardson	President C.E.O.	6-30-93

FORM CSSD-470 (5-89) Edition of FORM LS-470, 3-86, is obsolete

EXHIBIT A

ORIGIN AND BREEDING HISTORY OF BRAVADUR

'Bravadur' (D5171-1) was derived by Farmers Marketing Corporation from a F_2 head selection made in a genetic male sterile facilitated recurrent selection population. The population was developed by The University of Arizona and released as AZ-MSFRS-86 Quality Enhanced Spring Durum Wheat Germplasm. Seed from a single plant from the F_3 headrow was increased in El Centro, California in 1986 and seeded at Yuma, Arizona in 1987. Fifteen individual heads were harvested and planted in individual rows at Post Falls, Idaho, the Summer of 1987. Eleven seemed uniform and similar and were bulked to form the basis of D5171-1. The bulk (F_7) was grown for increase at Yuma in 1988. As male sterility and other segregation seemed to occur, forty-eight heads were snapped and grown in separate rows at Yuma in 1989. Thirty-one of the rows were bulked and increased at Mt. Vernon, Washington in the Summer of 1989 to form the present designated breeder seed for foundation seed production.

Bravadur was head rowed for purity and to supplement breeder seed in Spring of 1992 at Maricopa, AZ. D5171-1 is uniform and stable. No variant plants were identified. Although no male sterile plants were identified, seed set on unidentified male steriles, and further segregation may result in limited (.001%) genetic male sterility.

EXHIBIT B

NOVELTY STATEMENT

Bravadur is most similar to Mexicali 75 in plant type and appearance except for the following differences:

1. The shoulder beak of Bravadur is very long for a durum wheat at 10 mm, while the beak of Mexicali 75 is 2-3mm.

2. Bravadur brush has no collar, while Mexicali 75 is collared.

3. Heads of Bravadur appear flat sided. Face width of Bravadur is 3.5 mm less than the width of the two-row profile. The width of the Mexicali 75 heads are similar for both sides.

4. Test weight for bravadur is significantly higher than Mexicali 75 by 1 - 2 lbs per bushel.

5. Bravadur plant height is significantly shorter than Mexicali 75 by approximately three inches.

6. Bravadur is significantly less susceptible to lodging than Mexicali 75.

7. Bravadur consistently requires 1 to two more days to reach 50% heading when compared to Mexicali 75.

8. Bravadur maintains significantly higher wheat and semolina protein than Mexicali 75.

Table Descriptions

A. Tables 1a - 1d are for novelty statements and additional descriptions.

B. Tables 2 - 4 are for additional descriptions on agronomic data.

C. Tables 5 - 8 are for additional descriptions on quality data.

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
COMMODITIES SCIENTIFIC SUPPORT DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Farmers Marketing Corporation

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
3501 E. Broadway Road
Phoenix, AZ 85040

FOR OFFICIAL USE ONLY

PVPO NUMBER
9300257

VARIETY NAME OR TEMPORARY DESIGNATION
Bravadur (D5171-1)

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:
[2] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:
[1] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____
[2] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____
[3] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:
[1][1][2] FIRST FLOWERING
[1][2][2] LAST FLOWERING

4. MATURITY (*50% Flowering*):
[0][0] NO. OF DAYS *EARLIER* THAN .....
[0][0] NO. OF DAYS *LATER* THAN .....
[7] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS 7=Mexicali 75

5. PLANT HEIGHT (*From soil level to top of head*):
[0][8][6] CM. HIGH
[ ][ ] CM. TALLER THAN .....
[0][4] CM. SHORTER THAN .....
[7] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS 7=Mexicali 75

6. PLANT COLOR AT BOOTING (*See reverse*):
[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:
[1] 1 = YELLOW 2 = PURPLE

8. STEM:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[2] Waxy bloom: 1 = ABSENT 2 = PRESENT
[2] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT
[1] Internodes: 1 = HOLLOW 2 = SOLID
[0][4] NO. OF NODES (*Originating from node above ground*)
[1][7] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[1] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:
[2] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____
[2] Flag leaf: 1 = NOT TWISTED 2 = TWISTED
[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT
[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
[2][0] MM. LEAF WIDTH (*First leaf below flag leaf*)
[3][2] CM. LEAF LENGTH (*First leaf below flag leaf*):

11. HEAD:

[2] Density: 1 = LAX 2 = DENSE

[1-4] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) Wider across the two row profile than the face – appears flat sided.

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[1] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[7.5] CM. LENGTH [14] MM. WIDTH

12. GLUMES AT MATURITY:

[3] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)

[3] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

[6] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[3] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[3] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[3] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[2] Cheek: 1 = ROUNDED 2 = ANGULAR

[1] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[ ] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[2] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[08] MM. LENGTH [3.5] MM. WIDTH [56] GM. PER 1000 SEEDS

17. SEED CREASE:

[1] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[2] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] STEM RUST (Races) _____ [0] LEAF RUST (Races) _____ [0] STRIPE RUST (Races) _____ [0] LOOSE SMUT

[0] POWDERY MILDEW [0] BUNT [2] OTHER (Specify) Black point moderate resistance

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY [0] APHID (Bydv.) [0] GREEN BUG [0] CEREAL LEAF BEETLE

[0] OTHER (Specify) _____ HESSIAN FLY RACES: [ ] GP [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Mexicali 75	Seed size	Mexicali 75
Leaf size	Mexicali 75	Seed shape	Mexicali 75
Leaf color	Yavaros 79	Coleoptile elongation	------
Leaf carriage	Mexicali 75	Seedling pigmentation	Mexicali 75

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

EXHIBIT D

ADDITIONAL DESCRIPTIONS

Bravadur (D5171-1) is an early maturing spring durum with short, stiff straw. Juvenile growth habit is erect. Heads at maturity are white, dense and tapered. They are wider across the two-row profile than the face, thus presenting a flat-sided appearance. Glume shoulders are wide and apiculate. The beak is of medium width, acuminate and 8 - 10 mm long. Seeds are large elliptical, vitreous and amber. The kernel has very little brush and is not collared. The crease is moderately deep and wide with angular cheeks.

Overall semolina quality characteristics of D5171-1 have been very competitive with Durex and Westbred 881. D5171-1 has scored well under a variety of cultural environments. Yields have averages 9 percent more than Durex and Westbred 881 (quality, identity preserved varieties popular for the Italian market). Test weights are excellent, generally exceeded only by Yavaros 75 with less lodging susceptibility. Under environmental conditions subject to severe black point, D5171-1 exhibited less black point than any other of the commonly grown commercial varieties.

Polyacrylamide Gel Electrophoresis banding results indicate that Bravadur glutenin subunit sequences are different from varieties--Durex, Reva, and Yavaros 79. In addition, it is different from varieties patent pending --Durostar, Diavolo Duro, Bronco, and Amber.

Table 1a. Paired t-test analysis among three durum wheat varieties measured for test wt measured over 17 location years in Arizona and California.

	Bravadur	Mexicali 75	Reva
Bravadur		3.86**	2.72**
Mexicali 75			-.503

** = significant t at $\alpha = 0.05$

Table 1b. Paired t-test analysis among three durum wheat varieties measured wheat varieties for plant height measured over 17 location years in Arizona, and California.

	Bravadur	Mexicali 75	Reva
Bravadur		-3.606**	0.91
Mexicali 75			5.75**
Reva			

** = significant t at $\alpha = 0.05$

Table 1c. Paired t-test analysis among three durum wheat varieties measured for lodge rating measured over 14 location years in Arizona and California.

	Bravadur	Mexicali 75	Reva
Bravadur		-2.17**	0.-206
Mexicali 75			3.6501**
Reva			

** = significant t at $\alpha = 0.05$

Table 1d. Paired t-test analysis among three durum wheat varieties for days to 50% heading measured over eight location years in Arizona and California.

	Bravadur	Mexicali 75	Reva
Bravadur		3.2646**	1.1062
Mexicali 75			-1.8708
Reva			

** = significant t at $\alpha = 0.05$

Table 2. Grain yield and test weight among three durum wheat varieties measured over 17 location years.

	Yield (lbs/acre)			Test weight (lbs.bu)		
Location/year	Bravadur	Mexicali 75	Reva	Bravadur	Mexicali 75	Reva
Sacaton, AZ 1988	8183.0	7663.0	6814.0	66.50	64.00	64.50
Maricopa, AZ 1989	6517.0	7003.0	6670.0	64.50	64.00	63.50
Yuma, AZ 1989	6195.0	5211.0	6679.0	64.00	63.50	64.00
Maricopa, AZ 1990	6648.0	7390.0	5942.0	64.00	63.00	63.00
Yuma, AZ 1990	7679.0	6708.0	5942.0	64.00	64.00	63.50
Maricopa, AZ 1991	6520.0	7209.0	6670.0	64.50	65.50	65.50
El Centro, CA 1988	9370.0	9580.0	8930.0	63.30	62.80	62.50
El Centro,CA 1989	8310.0	8410.0	7870.0	63.80	63.00	62.80
Davis, CA 1988	6570.0	7230.0	7270.0	62.50	61.40	62.60
Davis, CA 1989	4630.0	4870.0	8550.0	62.30	59.50	61.00
Kings, CA 1988	6410.0	6560.0	6800.0	63.10	61.00	62.00
Kings, CA 1989	6400.0	2900.0	2480.0	56.20	51.70	49.50
Delta, CA 1988	7000.00	7510.0	7440.0	62.30	61.70	61.40
Delta, CA 1989	8120.00	7880.0	7730.0	63.80	62.70	62.70
El Centro, CA 1991	9630.00	9890.0	10530	64.00	63.00	62.80
Davis, CA 1991	5950.00	7450.0	7670.0	62.30	61.80	61.90
Kings, CA 1991	7250.00	7380.0	7930.0	63.70	62.40	63.60
Mean	7140.12	7108.47	7171.5	63.22	62.06	62.17
σ_{n-1}	1273.32	1652.51	1658.7	2.09	3.01	3.45
σ_{error}	308.83	400.79	402.3	0.51	0.73	0.84

Table 3. Plant height and lodge ratings among three durum wheat varieties measured over 17 location years in Arizona and California.

	Plant Height (in)			Lodge rating at Maturity		
Location/year	Bravadur	Mexicali 75	Reva	Bravadur	Mexicali 75	Reva
Maricopa, AZ 1988	37.0	37.0	37.0	2.0	3.0	1.0
Maricopa, AZ 1989	35.0	37.0	32.0	1.0	4.0	1.0
Maricopa, AZ 1990	35.0	37.0	33.0	5.0	5.0	5.0
Maricopa, AZ 1991	39.0	42.0	37.0	1.0	1.0	1.0
UofA, Maricopa 1988	28.0	37.0	34.0	1.0	6.0	2.0
Uof A, Maricopa 1989	35.0	37.0	34.0	1.0	6.0	2.0
Davis, CA 1988	37.0	40.0	38.0	1.0	2.5	1.0
Davis, CA 1989	36.0	30.0	33.0	1.0	7.0	7.5
Kings, CA 1988	36.0	40.0	36.0	7.0	8.0	7.8
Kings. CA 1989	33.0	35.0	32.0	8.0	5.0	3.3
Delta, CA 1988	37.0	42.0	38.0	6.0	3.0	4.5
Delta, CA 1989	39.0	42.0	40.0	2.0	3.0	2.0
El Centro, CA 1989	35.0	37.0	34.0	1.0	3.0	2.3
El Centro, CA 1991	35.0	37.0	33.0	2.0	4.0	2.8
Davis, CA 1991	41.0	43.0	41.0	0.0	0.0	0.0
Kings, CA 1991	39.0	43.0	39.0	0.0	0.0	0.0
Maricopa, AZ 1992	39.0	44.0	37.0	1.0	4.0	1.0
Mean	36.24	38.82	35.77	2.96	4.56	3.09
σ_{n-1}	2.97	3.63	2.86	2.67	1.99	2.61
σ_{error}	0.72	0.88	0.69	0.71	0.53	0.62

Table 4. Days to 50% heading and physiological maturity from January 1 measured for three durum wheat varieties over eight location years.

Location/year	Bravadur		Mexicali 75		Reva	
	50% head	Physical Maturity	50% head	Physical Maturity	50% head	Physical Maturity
Sacaton, AZ 1988	84.3	126.0	81.0	125.0	84.0	126.0
Maricopa, AZ 1989	87.0	134.0	84.0	132.0	86.0	130.0
El Centro, Ca 1988	84.0	137.0	82.0	137.0	81.0	138.0
El Centro, CA 1989	78.0	120.0	76.0	120.0	76.0	118.0
Maricopa, AZ 1990	88.0	136.0	88.0	137.0	87.0	137.0
Maricopa, AZ 1991	85.0	141.0	82.0	144.0	84.0	141.0
El Centro, CA 1991	76.0	118.0	76.0	120.0	78.0	120.0
Davis, CA 1991	100.0	148.0	100.0	142.0	101.0	144.0
Mean	85.25	132.50	83.63	132.13	84.63	131.75
σ_{n-1}	7.27	10.39	7.71	9.49	7.63	9.75
σ_{error}	2.57	3.67	2.73	3.36	2.70	3.45

//

Table 5. California Regional durum wheat quality means for the year 1991among five durum varieties.

Variety	1000 KWT†	ASH††	Wheat Protein†††	Hardness§	Fall No.§§	Total Extract§§§	Semolina Extract‡
Bravadur	59.80	1.80	14.23	119.00	431.30	79.70	63.90
Durostar	48.70	1.80	12.53	112.70	424.30	75.80	61.40
Amber	51.30	1.60	11.90	126.70	400.00	76.80	62.30
Bronco	53.50	1.70	13.10	122.30	456.70	80.10	63.40
Mexicali	57.60	1.70	12.40	123.70	449.30	78.70	63.00
LSD P=0.05	6.70	0.10	0.80	9.70	60.40	4.90	3.10

†1000 Kernel weight in grams.
††Ash content.
†††Wheat Protein on 14% moisture basis.
§Kernel hardness.
§§Fall No. = Semolina Falling Number.
§§§Total extraction percentage.
‡Semolina extraction percentage.

Table 6. California Regional durum wheat quality means continued for the year 1991 among five durum varieties. Data were derived by the USDA North Dakota State Quality Testing Lab.

Variety	SPK†	DUS††	MIX†††	Semolina Protein§	VI§§	Cook Wt.§§§	FIRM‡
Bravadur	58.70	85.00	3.33	13.00	8.50	31.80	5.80
Durostar	40.00	81.70	2.00	11.10	8.50	32.70	5.50
Amber	65.70	95.00	2.00	11.40	9.50	33.00	4.70
Bronco	62.00	85.00	1.70	11.70	8.70	32.70	5.40
Mexicali	48.60	85.00	3.00	11.30	7.80	32.80	5.30
LSD p=0.05	34.00	8.20	0.90	0.80	0.50	1.60	0.80

†Semolina speck count.
††Semolina dust color.
†††Mixograph score.
§Semolina protein percentage.
§§Spaghetti visual color score.
§§§Cooking weight in grams.
‡Cooked spaghetti firmness score.

Table 7. Mean quality data among 11 durum wheat varieties. Data were derived by the USDA North Dakota State Quality Testing Lab. Means indicate sample results combined over four location years in California.

Variety	Sedimentation	Wheat Protein	Hardness	Semolina Extract	Semolina Color	Semolina Protein
Reva	41	14.2	116	63.3	95	13.5
Mexicali	31	12.0	113	65.1	80	10.7
Durostar	32	12.9	114	65.1	80	12.4
Amber	17	12.6	117	64.8	95	11.5
Bravadur	35	14.1	116	65.5	88	13.7
Durex	44	13.1	117	66.5	93	12.4
Yavaros	22	12.3	122	61.1	60	10.4
Westbred 881	33	12.4	120	64.5	90	11.6
Diavolo Duro	35	11.7	118	59.3	80	10.3
Bronco	21	11.6	120	61.1	80	10.0
Mean	31.1	12.7	117.3	63.9	84.1	11.7
σ_{n-1}	8.7	.91	2.8	2.5	10.6	1.3

Table 8. Polyacrylamide Gel Eletrophoresis banding results[†] for glutenin subunits among eight durum wheat varieties tested by the University of California , Department of Agronomy and Range Science.

Variety	Glutenin Subunits						SDS SED[§§]
	OMEGA[§]	LMW[††]	GAMMA[§]	BETA[§]	ALPHA[§]	HMWB1[†††]	
DUREX	1	2	1	2	3	6 + 8	67
BRAVADUR	1	2	1	2	1	6 + 8	51
DUROSTAR	1	2	1	1	3	6 + 8	55
DIAVOLO DURO	1	2	1	1	3	7 + 8	55
BRONCO	1	1	1	2	1	6 + 8	31
AMBER	1	1	1	1	1	6 + 8	21
REVA	1	2	1	1	1	6 + 8	67
YAVAROS	1	1	1	2	1	20	28

[†]Significant interactions between LMW and HMWB1 revealed that in presence of LMW 2, lines with bands 6 + 8 had higher sedimentation values than those with bands 7 + 8. In the presence of LMW 1, the order is reversed. Therefore, a genotype with LMW 2 and HMWB1 6 + 8 is of higher gluten strength. Presence of alpha 3 , especially with beta 2 promote quality.
[††]LMW = Low molecular weight glutenin subunits.
[†††]HMBW1 = High molecular weight glutenin subunits
[§]Omega, Gamma, Beta, and Alpha glutenin variants.
[§§]SDS Sedimentation.

EXHIBIT E

STATEMENT OF THE BASIS OF APPLICANTS OWNERSHIP

Regular employees of the applicant, Farmers Marketing Corporation have developed Bravadur.

Farmers Marketing Corporation is the proprietary owner and intended commercial user of the variety.